Do Your CATS PRRR?: A Mnemonic Device to Teach Safety Checks for Administering Intravenous Medications

Nurses use the 6 rights of medication administration as a basic safety strategy to avoid medication errors that could cause harm or death to patients. Preparation and administration of intravenous (IV) medications is a complex procedure that can involve 50 or more steps for one medication. In conjunction with these steps, nurses must be up to date regarding the complex technology and safety features of the various IV pumps on their units. This column describes a mnemonic device that can be used as a safety strategy to help nurses avoid IV medication errors that could ultimately result in harm or death to the patient.

MEDICATION ERRORS
More than 1 million serious preventable injuries that occur annually (Schyw, 2004) and at least 7,000 deaths in the United States each year (Kohn, Corrigan, & Donaldson, 2000) are a result of medication errors. A study of medication errors over 6 weeks at two healthcare institutions revealed that 337 or 55% of the 616 total medication errors were related to administration of IV medications (Kaushal et al, 2001).

Leape (2000) lists many psychological and physiological factors that can contribute to these types of errors, such as stress (interpersonal or work related), a hectic work environment, fear, and anxiety. If the individual becomes distracted or does not pay attention to the task at hand during a crucial moment, a slip or mistake can be made. Other studies found the most common cause of medication errors to be human factors such as knowledge deficit and performance errors (Phillips et al., 2001), as well as miscalculation of dosage or infusion rate, drug preparation error, and stress (Thomas, Holquist, and Phillips, 2003).

These statistics confirm that learning and remembering all of the many facets of safe IV medication preparation and administration are vital to prevent medication errors that could harm or cause death to patients.

DEVELOPMENT OF THE MNEMONIC DEVICE
Using a mnemonic device (a formula or rhyme used to assist the memory) can prevent nurses from entering into the automatic mode of thinking. Early in my nursing career, while working as a staff nurse on a stressful and hectic medical-surgical unit, I developed the mnemonic CATS to help me remember the important safety checks of IV medication administration. As IV pumps became more prominent in administering IV medications, I modified the mnemonic to CATS PRRR (Table). This mnemonic was written on my clipboard and I referred to it each time I administered an IV medication.

Nurses using this mnemonic device will not have to depend on a faulty memory because they will have the written safety checks grid to refer to. This grid provides programmed and sequential information and can reassure the nurse that he or she is not missing one of the important assessment steps. Nurses will have to critically assess each of the questions outlined on the grid with each IV medication. Not being able to respond to one of the questions should alert the nurse to a potential error.

Nurses may find the mnemonic device helpful to keep their thoughts on task in a hectic and stressful working environment. For example, a nurse who is interrupted in the middle of performing the preparation and administration checks can return to the point on the grid at which he or she was interrupted and continue the safety checks. The grid could therefore help the nurse to continue to safely and competently prepare and administer IV medications and avoid slips or mistakes in a busy working environment.

Having the mnemonic close at hand to review can also help to alleviate some of the stress and anxiety of IV medication administration for the novice nurse or when the more experienced nurse is administering unfamiliar IV medications. Decreasing psychological factors such as stress, fear, and anxiety can play a positive role in error prevention when preparing and administering IV medications.
## TABLE
### DO YOUR CATS PRRR? MNEMONIC DEVICE

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### THE MNEMONIC DEVICE

The C stands for compatibility and reminds nurses to assess whether the IV drug to be administered is compatible with the fluid, other medications, lipids, total parenteral nutrition, or other ordered IV components currently infusing.

The A stands for Allergies. There were several times when patients informed me of drug allergies that were not noted on the plan of care or medication administration record, or the patient was not wearing an allergy band indicating allergies. By taking the time to check with the patient regarding allergies, errors can be avoided and the plan of care and medication administration record can be updated or an allergy band applied.

The T stands for Tubing and reminds nurses to assess whether it is time to change the tubing. The T also reminds nurses to assess whether they have the correct tubing for the medication they are administering. The grid alerts nurses to check for kinks or other problems with the tubing that could impede the infusion of medication. Nurses are also reminded to place a designated sticker on the tubing to indicate the date and time they placed new tubing and the type of drug infusing through the tubing.

The S stands for Site and reminds nurses to determine whether the site is safe to use. It also reminds nurses to check for infiltration or signs of phlebitis. Nurses who commonly administer irritating drugs or vesicants should be aware of extravasation procedures for their unit.

The second part of the mnemonic is related to the use of IV pumps for administration of IV medications. The P stands for Pump and reminds nurses to check for the 4 P’s of pump safety.

The first P stands for programmed precisely and reminds nurses to check that the medication is programmed correctly. In addition, nurses should double-check correct programming of any other medications that may be infusing via the other pump chambers. Medication errors are more likely to occur with multiple medications infusing through more than one of the IV pump’s chambers. A report from the Food and Drug Administration indicated that 7% of IV medication errors reported for May 2001 were due to miscalculation of dosage or infusion rates (Thomas, Holquist, & Phillips, 2003).

The second P stands for Personality. Many of the newer pumps now come equipped with hepa-
rin and insulin “personalities” to prevent serious medication errors when infusing drugs considered to be high-alert drugs. High-alert drugs have a high risk of causing injury and could have devastating outcomes for the patient if not administered correctly (Cohen, 2000). The grid reminds nurses administering a high-alert medication to have another nurse perform an independent check to verify the 6 rights and pump settings. Cohen (2000) postulates that a second independent check will make any errors visible and thus avoidable. The personality feature must be programmed in for this feature to work properly. Nurses should be aware of high-alert drugs commonly given in their institution.

The third P stands for Pumping mechanism. IV pumps are great aids for busy nurses, but pumping mechanisms can and do fail. It is important for nurses to check the drips flowing into the drip chamber in accordance with the rate set when hanging a new medication.

The final P reminds nurses to always Plug the pump into an electrical outlet whenever possible to avoid draining the battery and prevent pump failure. Many pumps are equipped with an alarm system indicating when the battery is low; nurses should heed this alarm and immediately plug the pump into the nearest outlet to prevent the pump from failing.

The first R stands for Rate and reminds nurses to double-check the rate programmed into the pump for the medication to be administered or to know the correct rate for giving an IV push medication. Nurses administering IV push drugs too quickly can cause minor adverse effects or serious and deadly effects. A study performed in the United Kingdom uncovered errors in 49% of all IV medications (Taxis & Barber, 2003). The study noted that 79% of these errors occurred during the administration of drugs given an IV push; 95% of the IV push drugs were reported as having been given too fast.

The second R stands for Release the clamp on the piggyback medications. A common error is often caused by not attending to this last step in IV medication administration, resulting in omission of medication or an error in the time the medication was scheduled to be given.

The last R reminds nurses to Return to reassess the patient to see how well the medication was tolerated and to assess whether the medication was effective. For example, if the medication administered was for pain, did it help? This R also helps nurses to Remember to chart.

SUMMARY
Reasons for errors in medication administration are complex, and healthcare facilities are on a constant vigil to find ways to reduce medication errors and subsequent harm to patients. Hepler and Segal (2003) discuss the idea of medication errors as a result of system failure. The authors describe a system as “a set of interdependent elements interacting to achieve a common aim” (Hepler & Segal, 2003, p. 49), and agree that elements of systems may include individuals, equipment, and techniques. Nurses, pharmacists, physicians, other healthcare providers, and the patients themselves are all involved in this system.

The mnemonic device described in this column can help to improve the safety of nurses’ practice by assisting them to remember the many facets of safe techniques for IV medication preparation, administration, and use of the various IV pumps.

REFERENCES

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